The hole *E* is frst opened up by a small twist drill, which makes the work considerably easier for the so-called rose-bit drill. The latter drill leaves $_{T}$Y inch of stock for the rose reamer to remove, which produces a very smooth, straight, and concentric hole. The last operation is the facing of the holes. The holes just drilled are now used to guide the pilots of the facing tools, and, as the operation is performed while the work is held in the jig, it is important that the locating or strapping arrangements should not be in the way.

In connection with the opening up of a hole with a smaller drill, it may be mentioned that it is not only for large holes that this method of procedure will save time, but the method is often a time-saving one also for smaller holes, clown to J inch in diameter, when drilled in steel.

The use of lubrication in jigs is a very important item, the most common lubricant being oil or vaseline, but soap solution is also used. The objection to the latter is that unless the machine and tools are carefully cleaned it is likely to cause rusting. Using a lubricant freely will save the guiding arrangements, such as the drill bushings, the pilots on counterbores, etc., to a great extent.

The jig in Fig. 15 is shown in Fig. 16 and a clear idea of the design of the jig will be had by studying this line engraving. The bracket *B,* in Fig. 15, coulcl have been drilled in a different way than described, which would sometimes be advantageous. It could be held in a chuck, and the hole *E* reamed and faced in a lathe, which would insure that the hole would be perfectly central with the outside of the boss. Then a jig could be designed, locating the work by a stud entering in hole *E,* as indicated in Fig. 17, additional dowel pins and set-screws being used for locating the piece sidewise. The whole arrangement could be held down to the table by a strap and bolt, a jack-screw supporting it at the overhanging end.

Fig. 18 shows another jig of the closed type, with the work inserted. The piece *A* is a casing, and the holes to be drilled vary greatly in size. The casing rests on the flat, finished bottom surface of the jig and is brought up squarely against a finished pad at *B. It* further locates against the finished lug *C,* in order